

**AMENDMENTS TO THE DRAWINGS:**

The attached sheets of drawings includes changes to Figs. 1 and 4. These sheets, which include Fig. 1 and Fig. 4, replace the original sheets including Fig. 1 and Fig 4. In Fig. 1, reference item 126 under reference item 110 has been changed to --128-- to correct a typographical error. (See paragraph [0022].) In Fig. 4, the reference character --400-- has been added, as required by the Examiner on page 3 of the Office Action and described in paragraph [0022] of the Office Action. Also in Fig. 4, "Zin" has been replaced by "Yin" because the figure shows admittance along the waveguide path 404, as described in paragraph [0025] of the specification.

Please replace the original drawing sheets, which include Fig. 1 and Fig. 4, with the new attached sheets including Fig. 1 and Fig.4.

Attachments: Replacement Sheet  
Annotated Sheet Showing Changes

**REMARKS**

Prior to the present response, claims 1-20 were pending. By way of the above amendments, claims 1, 8, 10-15, and 17-20 have been amended, and claims 21-34 have been added. Accordingly, claims 1-34 are currently pending. Favorable reconsideration is respectfully requested.

Independent claim 1 has been amended to recite that the waveguide comprises at least one electrically conducting surface and that the electromechanical means is for changing a physical dimension of each electrically conducting surface along the waveguide path. Independent claim 8 has been amended to recite a step of changing physical dimensions of at least one electrically conducting surface along a waveguide path by actuating an electromechanical device. Amendments to independent claim 10 recite that the waveguide has conducting surfaces along the waveguide path and the change in a physical dimension is a change in the at least one of the conducting surfaces along the waveguide path. Claim 12 has been amended to recite that the micro-electromechanical device is positioned sufficiently adjacent to the waveguide path to change a size of an electrically conducting area of the waveguide along the waveguide path, and to broaden the claim in some respects. Support for the amendments to claims 1, 8, 10 and 12 can be found throughout the specification, for example, in original paragraphs [0020], [0024], [0025], [0027] and [0029], and Figures 1-6.

Dependent claim 11 has been rewritten to include features of original claim 10 and to recite that the plurality of electro-mechanical devices is positioned entirely within the waveguide. Support for this amendment can be found, for example, in Figs. 4-5 and paragraphs [0023] through [0035] of the specification.

New claims 21, 26 and 31 find support in paragraphs [0018], [0021] and [0026] of the specification, in Figs. 3, 5 and 6 and original claim 12, for instance. New claims 22, 27 and 32 are supported, for example, by the description of the exemplary conducting shutter elements starting at paragraph [0019] and throughout the rest of the specification, and in Figs. 1 to 6. Support for new claims 23, 28 and 33 can be found at least in Figs. 4-5 and paragraphs [0023] through [0035] of the specification. Subject matter recited in new claims 24, 29 and 34 is found, for example, in the description of exemplary embodiments at paragraphs [0018] and [0029] of the specification, and in Figs. 5 and 6. Support for new claims 25 and 30 can be found throughout the original disclosure, for example, at paragraphs [0018], [0026] to [0032] and [0034], Figs. 1-6 and original claim 12.

### **The Objections to the Disclosure**

The Office Action, at page 2, includes an objection to the disclosure for containing informalities. It is respectfully submitted that the above amendments to the specification address the concerns expressed in the Office Action.

On page 3 of the Office Action, the Examiner notes that the reference labels Zin, Yb, Yc, and Yd, as depicted in Fig. 4, are not explicitly described in the specification. In response, paragraph [0025] of the specification has been amended to provide explicit description for the admittances Yb, Yc, and Yd shown in Fig. 4. The present response also includes proposed drawing changes in which the item "Zin," as shown in Fig. 4, has been changed to an admittance "Yin." Support for this change is found in original paragraph [0025], which describes an admittance "Y" along the waveguide path 404.

In connection with Fig. 5, the Office Action asserts that items 530 and 532 are not described in the specification. However, it is respectfully submitted that these items are adequately described in the original specification, at paragraph [0027], lines 6-10: "Each of the micro-electromechanical devices in row x of arrays 506-510 is connected (directly or indirectly) to the top surface 502a of the waveguide with *a conductive strip 530*. Each of the micro-electromechanical devices in row x of arrays 512-516 is connected (directly or indirectly) to the bottom surface 502b of the waveguide with *a conductive strip 532*" (emphasis added).

The Office Action also asserts that reference labels 633 and 634y shown in Fig. 6 are not explicitly described in the specification. With respect to reference item 633, Applicants respectfully submit that explicit description for this reference label is provided in the specification in original paragraph [0030], lines 5-7: "The shutter 624x can unroll to and hold a position within *a range of positions 633* depending upon the voltage applied between the shutter element 624x and the sill electrode 632x" (emphasis added). With regard to reference label 634y shown in Fig. 6, the specification has been amended to include the following: "The second row exemplary micro-electromechanical device 600y also may include a sill insulator 634y between the sill electrode 632y and the shutter 624y." Support for this amendment is found, for example, in original Figure 6 and in description in original paragraph [0031], lines 6-8.

The Office Action includes an objection to the drawings because Fig. 4 does not show reference labels "400," "Y" and "L." In response, Applicants submit herewith proposed drawing change to Fig. 4 that includes the reference labels "400" and "Yin." As noted above,

Applicants' proposed changes to Fig. 4 include replacing "Zin" with "Yin" and have amended the reference "Y" to "Yin" in the specification because the original specification describes Fig. 4 as showing admittance along the waveguide path 404. Applicants have removed the reference to "L" in the specification because it is believed that the description in paragraph [0025] of separations between openings refers to the exemplary separations "Lbc" and "Lcd" would render redundant such inclusion of an additional label "L."

It is respectfully submitted that the changes to the specification and proposed changes to the drawings fully address the objections raised in pages 2 to 3 of the Office Action. Accordingly, it is requested that these objections be withdrawn.

**The Rejection Under 35 U.S.C. §112, Second Paragraph**

The Office Action rejected claims 13-20 under 35 U.S.C. § 112, second paragraph, for allegedly being indefinite. Applicants disagree that claims 13-20 were indefinite, particularly when read in light of the specification. However, to address the concerns on page 3 of the Office Action, claim 22 has been changed. It is believed that these changes have rendered moot the rejection. Applicants respectfully submit that amended claims 13-20 are definite, and thus fully comply with the requirements of Section 112, second paragraph. Accordingly, Applicants request that the rejection be withdrawn.

**The Amended Claims Recite Patentable Subject Matter**

The Office Action includes rejection under 35 U.S.C. §102(b) of claims 1, 8, 9 and 12 as being anticipated by U.S. Patent No. 4,575,697 to Rao et al., a Section 102(e) rejection of

claims 1, 7, 8, 9 and 12 as being anticipated by Malone et al., and a Section 102(b) rejection of claims 1, 8, 9, 10, 11 and 12 as being anticipated by U.S. Patent No. 2,775,741 to Corbell. To the extent that the Examiner may consider these rejections to apply to amended claims 1, 8, 10, 11 and 12, and hence also to their respective dependent claims, these rejections are respectfully traversed.

Rao et al., Malone et al. and Corbell Do Not Disclose All Claimed Features

Independent claim 1 has been amended to recite that an inline phase shifter comprises a waveguide *having at least one electrically conducting surface* and a waveguide path, and at least one electromechanical means for changing a physical dimension *of the electrically conducting surface along the waveguide path* to phase shift a signal which travels along the waveguide path. In contrast, each of the Rao et al. Malone et al. and Corbell patents fails to anticipate claim 1 because each describe a device that introduces a dielectric material into a waveguide. (See Rao et al., column 2, lines 37-39, column 3, lines 1-2 and lines 34-36; Malone et al., column 2, line 27 and lines 58-61; and Corbell, column 1, lines 42-43 and column 2, lines 25-45.) Hence, the applied documents fail to anticipate claim 1 because they do not disclose the claimed combination of each and every feature.

Similar distinctions are recited in independent claims 8, 10 and 12. For instance, claim 8 is directed to a method for phase shifting a signal that comprises the step of *changing physical dimensions of at least one electrically conducting surface along a waveguide path* by actuating an electromechanical device. Independent claim 10 recites, *inter alia*, a waveguide having conducting surfaces along a waveguide path, and a plurality of electromechanical

devices positioned serially along the waveguide path sufficiently adjacent to the waveguide path *to change a physical dimension of at least one of the conducting surfaces* along the waveguide path. Independent claim 12 recites, *inter alia*, at least one micro-electromechanical device positioned sufficiently adjacent to the waveguide path *to change a size of an electrically conducting area of the waveguide* along the waveguide path. By contrast, none of the Rao et al., Malone et al. and Corbell patents disclose these features because each describe use of only dielectric materials for shifting a phase.

Claim 12 additionally recites that the devices adjacent to the waveguide path are *micro-electromechanical* devices. It is respectfully submitted that the piezoelectric devices of Rao et al. and Malone et al., and Corbell's bulky mechanical means including a jack cannot reasonably be considered micro-electromechanical devices as claimed.

Independent claim 11 is directed to a waveguide having a waveguide path and a plurality of electromechanical devices positioned serially along the waveguide path sufficiently adjacent to the waveguide path to change a physical dimension of the waveguide path upon actuation of at least one of the plurality of electromechanical devices. Claim 11 recites that the plurality of electro-mechanical devices is positioned *entirely* within the waveguide. It is respectfully submitted that none of the applied references disclose this claimed combination of elements.

To the contrary, each of the Rao et al., Malone et al. and Corbell patents disclose that a dielectric member is inserted through a waveguide wall by way of an actuator residing outside a waveguide. For instance, the Corbell patent describes a device in which dielectric probes 38/39 are inserted through openings 46/47 in the waveguide (see Figs. 1-4 and column 2, lines

17-22), the Rao et al. patent discloses inserting a dielectric “fin” 25 through a slot 27 in a waveguide (column 2, lines 37-39), and Malone et al. describes inserting a rectangular dielectric vane 255 into a rectangular gap 274 in a waveguide 202 (column 2, lines 27-31 and lines 64-67, and Figure 2). In each of the applied references, the mechanisms that cause the dielectric material to enter into a waveguide are positioned *outside* the waveguide. (See the jack mechanism 28 of the Corbell patent, the cantilever/clamp 13/15 mechanism of Rao et al., and the actuator 270 of Malone et al.) Hence, none of the patents applied in the Office Action disclose a plurality of electro-mechanical devices positioned *entirely* within the waveguide, as claimed.

For the above reasons, it is respectfully submitted that each of the Rao et al., Malone et al. and Corbell patents fail to anticipate amended claims 1, 8 and 10-12. Claims 2-7, 9 13-20, and new claims 21-34 depend from one of claims 1, 8, 10 and 12, and are therefore patentable for the above reasons. In addition, the features recited in the dependent claims set forth combinations including further points of distinction.



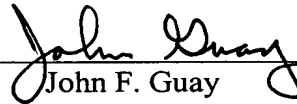
For all the foregoing reasons, Applicants respectfully submit that the present application is in condition for allowance and a notice to that effect is earnestly solicited. Should the Examiner have any questions regarding this response or the application in general, he is urged to contact the undersigned.

Respectfully submitted,

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By: \_\_\_\_\_



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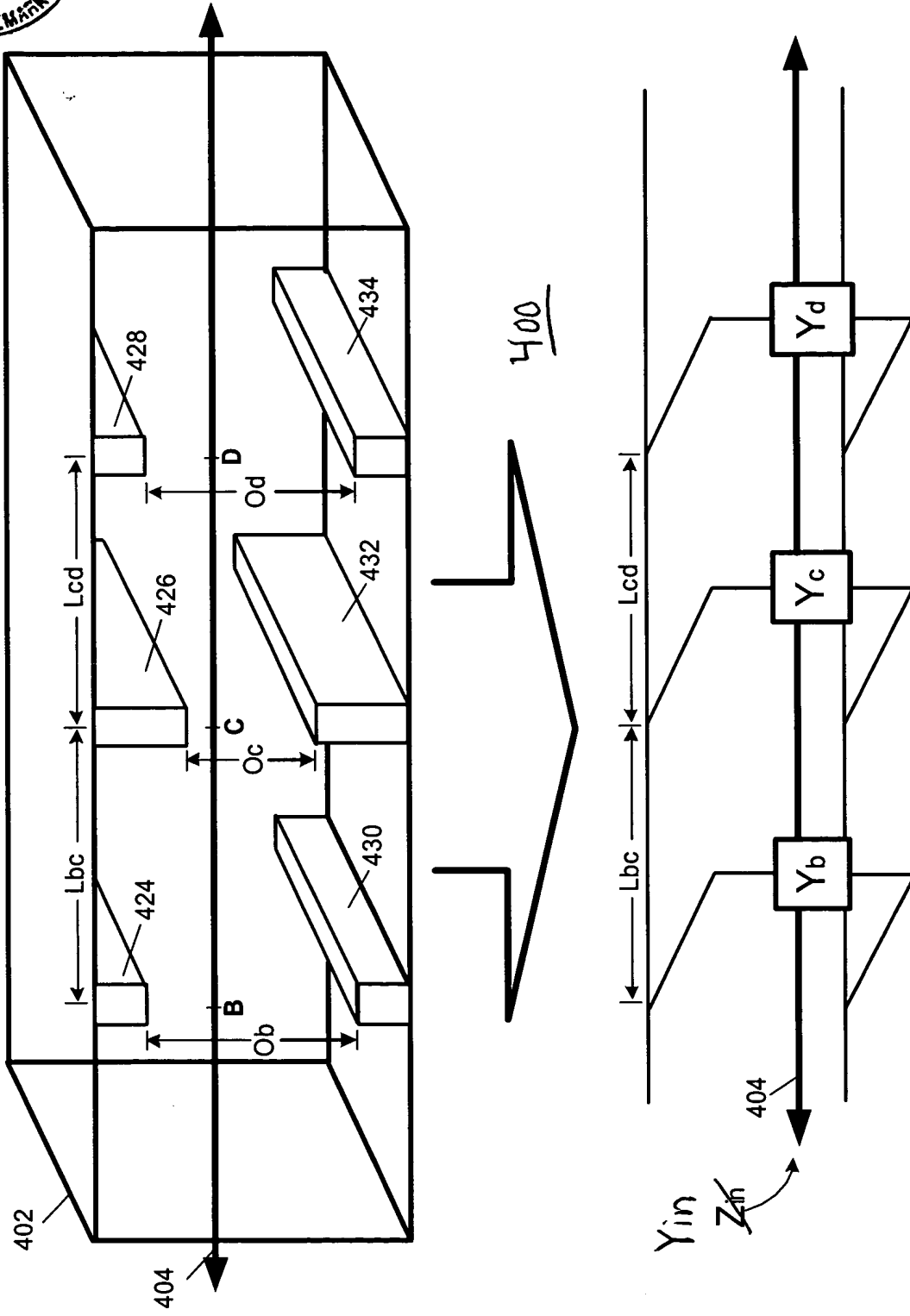


Fig. 4

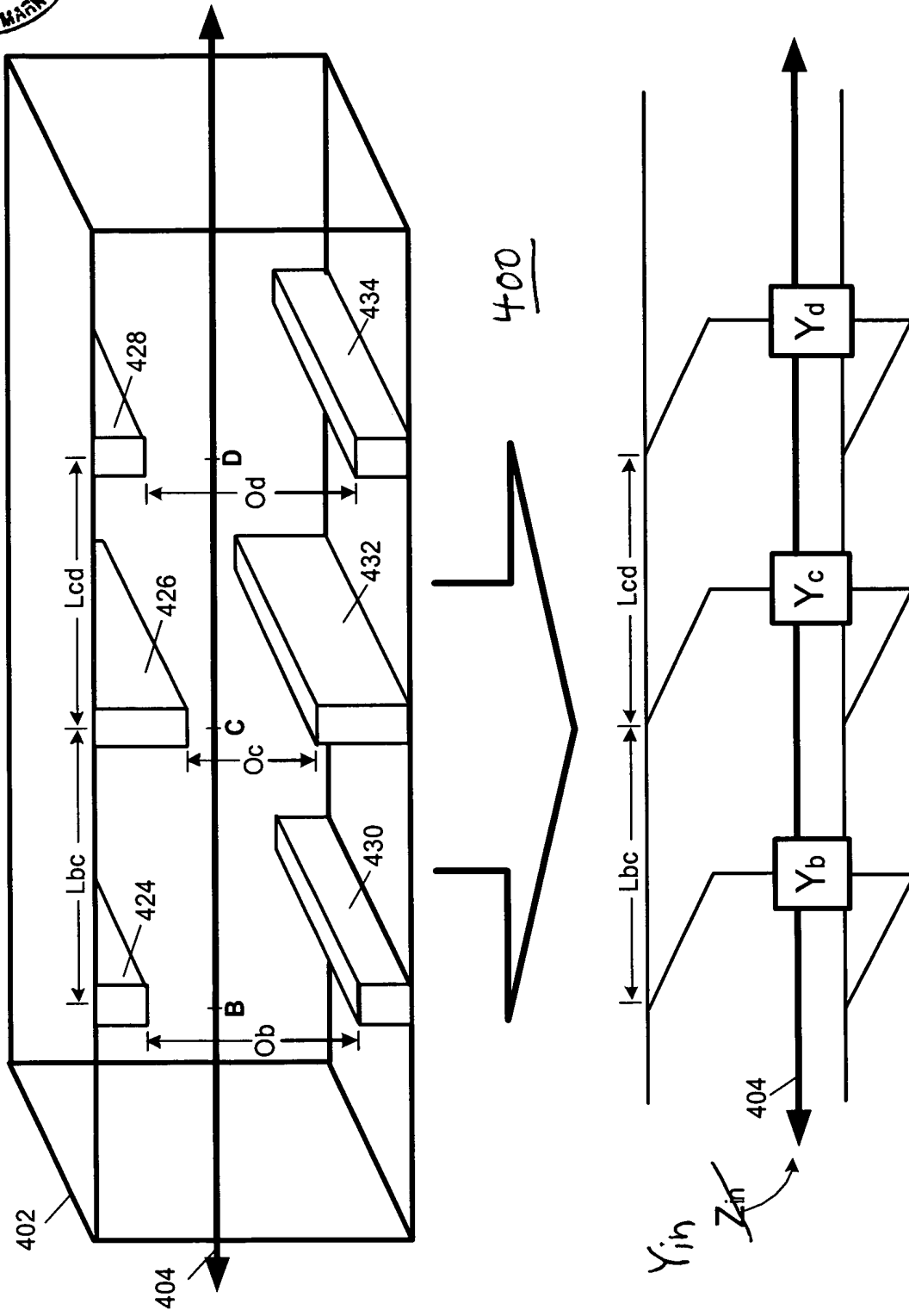


Fig. 4